Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

known, in America at least, by the devoted attention he has given to the cause of a better international agreement on the controversial subject of nomenclature. As reporter-general of two international congresses, he has won universal admiration for clarity and fairness, and has gained the warmest gratitude of his colleagues for the exceptional efficiency and energy, which, with great self-sacrifice, he brought to bear upon an exceedingly intricate, time-consuming, and unremunerative task.

It has been generally known that BRIQUET for the last ten years or more has been engaged, notwithstanding the serious interruptions to which we have alluded, in an intensive study of the Corsican flora. In order to gain ample collections and a first-hand familiarity with the floristic conditions, no less than six expeditions to Corsica were made by him and his associates. Not only were the more accessible parts of the island repeatedly visited, but the wilder portions of the interior, including primitive woodlands, still infested by brigands, were traversed and examined.

The publication now at hand is the first volume of what has been modestly styled a *Prodrome*. It is an imperial octavo of something over 650 pages, and contains, besides prefatory matter and bibliography, a critical catalogue of the vascular plants of Corsica from the Hymenophyllaceae to the Lauraceae, including 722 species and many varieties. Under each, the citation of literature, synonymy, and exsiccatae is exhaustive. Habital notes and comments on distinctive characters, distribution, environment, etc., abound, and at points keys are introduced to elucidate distinctions between plants of the Corsican flora and their nearest relatives found elsewhere.

Without the slightest depreciation of its other and more scientific merits, it may be safely said that no small part of the interest attaching to BRIQUET'S work will be found in the fact it exemplifies, probably in a higher degree than any other flora published to date, the conscientious application of the international rules of nomenclature by one specially trained in all their shades of meaning and intricate details.—B. L. ROBINSON.

NOTES FOR STUDENTS

Genetic studies in Oenothera.—The important deductions made by DEVRIES, from the results of a twenty-years' study of *Oenothera Lamarckiana* and its derivatives, have created an unusual interest in this species and its relatives. Numerous investigations have been made by many students, without any apparent exhaustion of the wealth of interesting phenomena presented. The oenotheras seem destined to yield results of great value for a long time to come, for the interest in the group grows greater rather than less with further study. The validity of some of DEVRIES'S conclusions rests upon the correctness of the assumption that *O. Lamarckiana* is a native species. Many diligent searches have been made in the effort to discover it in a natural habitat in America, but so far without success.

Davis[6] believes that *O. Lamarckiana* does not occur as a native species, but that it is a hybrid, probably between forms of *O. grandiflora* and *O. biennis*, and that it originated in European gardens, or that it may have occurred as a wild hybrid. To test this hypothesis he is making numerous crosses between different forms of these two species, and selecting those types among the hybrid progenies which most closely resemble *O. Lamarckiana.* He reports that all of the hybrid forms thus far produced by him differ from *O. Lamarckiana* in several important points, but that the resemblances of some of them to that species are such that the taxonomist would at least place these hybrids next to *O. Lamarckiana.* Davis is not convinced, by the evidence at hand, that the plants figured in certain old plates or described in various horticultural magazines of a century or more ago are to be safely referred to *O. Lamarckiana*, as they have been by several writers. The effort to synthesize *O. Lamarckiana* is being continued by the use of other biotypes of the two chosen species, and it is expected that some of these will offer a still closer approach to the desired result. Reports on these further studies will be awaited with the greatest interest, and especially regarding the capacity of any of the new forms to yield a series of true-breeding segregates, such as the forms derived from *O. Lamarckiana* which are now generally recognized as mutants.

All students of genetics who have handled the oenotheras in hybridization experiments appreciate the fact that they are quite anomalous in their hereditary behavior, and that they do not clearly follow the simple procedure usually observed in the hybrids of other plants and of animals. Under the circumstances, no far-reaching generalizations should be drawn from studies in the oenotheras except on the basis of extensive cultures and the most careful analysis of results. Gates[7] has made some features of *O. rubrinervis* and of a derivative from it, which he calls *O. rubricalyx*, the basis of generalizations regarding the nature of unit-characters, which appear to the reviewer not to observe this desired caution. *O. rubricalyx* differs from *O. rubrinervis* not only in amount of anthocyan in leaves and buds, but also to some extent in its distribution, the latter form having a red hypanthium, red midribs of the sepals, and red on the ventral surface of rosette-leaves and especially of their petioles, in which positions *O. rubrinervis* has a green or yellowish color. Nine cultures from self-fertilized *O. rubricalyx* gave in each case not only *O. rubricalyx*, but also *O. rubrinervis* offspring, though the ratios were not satisfactorily determined. The conclusion is reached that therefore *O. rubricalyx* is incapable of breeding true. The number of families is too small, however, to warrant this conclusion, for Mendelian expectation would allow six of the nine parents to be heterozygous, and it puts no strain on the "errors of random sampling" to account for the remaining three as a purely chance result. Reciprocal crosses between *O. rubricalyx* and *O. Lamarckiana* seem to have resulted in each case in a progeny of *rubricalyx* and *Lamarckiana*, though the determinations were defective. The appearance of these two types in the first generation seems at first glance to be distinctly unlike Mendelian behavior, but if the *rubricalyx* plants used for the crosses were heterozygous, two types should have been expected in the progeny. The author uses the expression "alternative inheritance" for cases in which the two parental types appear in the F_1 and breed true in later generations. This new use of the expression "alternative inheritance" will result in confusion if it is adopted by others, since all Mendelian inheritance is "alternative," as the expression is now generally used among geneticists.

---

[6] Davis, B. M., Genetic studies on *Oenothera.* II. Some hybrids of *Oenothera biennis* and *O. grandiflora* that resemble *O. Lamarckiana.* Amer. Nat. **45**:193–233. *figs. 18.* 1911.

[7] Gates, R. R., Studies on the variability and heritability of pigmentation in *Oenothera.* Zeit. f. Ind. Abstam. Vererb. **4**:337–372. *pl. 1. figs. 5.* 1911.

GATES is of the opinion that *O. rubricalyx* represents a progressive mutation from *O. rubrinervis*, and that it is not to be explained on the basis of the presence and absence hypothesis. For the simple and direct, though somewhat formal and figurative, terminology generally used in describing Mendelian behavior, GATES would substitute " a quantitative readjustment of the relation between the substances which by their chemical interactions produce anthocyan, and those which decompose it as soon as formed, or which, by their presence, divert the metabolic processes and bring about chemical reactions of a different sort."

While the extent of the anthocyan in *O. rubricalyx* proved to be strictly inherited, the various grades of color in *O. rubrinervis*, whose wide range of pigmentation is described and figured in detail, were proved on extensive cultures not to be inherited, the offspring from plants having a relatively low degree of pigmentation having the same average pigmentation as the offspring from parents having a high degree of pigmentation. A strain of oenotheras received from Liverpool, England, which obviously constituted a somewhat heterogeneous population, showed an amount and arrangement of color on the buds similar to those of *O. rubrinervis*, but in this strain the degree of pigmentation was partially hereditary. It seems probable that the apparent inheritance of the degree of pigmentation in the latter case is due to the heterogeneity of the strain, and that the different progenies which resembled their parents in the degree of pigmentation of their buds represent the segregation of more or less pure genotypes from the hybrid mixture.

DEVRIES[8] has continued his studies on hybridization in the oenotheras, and announces results of unusual theoretical interest, which together with the discovery of "twin hybrids," earlier reported[9] by the same author, the reviewer believes will go far toward solving the anomalous hereditary behavior of the oenotheras. As reported in *Die Mutationstheorie* (2:471), reciprocal hybrids among the oenotheras are frequently unlike, being usually similar to the type of the pollen parent. To discover the significance of this phenomenon the author crossed together the reciprocal hybrids, thus $(A\times B)F_1\times(B\times A)F_1$. The results of such a cross he calls "double reciprocal hybrids." For the study of these double reciprocal hybrids he has used chiefly *O. biennis* and *O. muricata*. It will be seen that there are two possible combinations of the same reciprocal hybrids, e.g. (*biennis*×*muricata*)×(*muricata* × *biennis*) and (*muricata*×*biennis*)×(*biennis*×*muricata*). In the first case the *muricata* occupies the middle place in the formula and *biennis* the extremes, while in the second case the position of the two parent species is reversed. The remarkable and unexpected result of these crosses is the complete disappearance of the characters of the species occupying the middle position in these formulae. Thus (*biennis*×*muricata*)×(*muricata*×*biennis*) produces a progeny consisting only of *biennis*, while the alternative arrangement of the parents results in a progeny of pure *O. muricata*, the *biennis* having completely disappeared. This remarkable result does not belong only to the *biennis-muricata* cross, but six other combinations in which *O. biennis* entered as one of the parental types followed always the same law. These six combinations involved a small-flowering "*O. biennis*" from Chicago, *cruciata*, *strigosa*, *Hookeri*, *Lamarckiana laeta*, and *Lamarckiana velutina*. The same principle holds when one of these F_1 hybrids is crossed with one of the parental types, e.g. $(A\times B)F_1\times A$, the result being the same as if the middle parent had not entered into the breeding (in the example the offspring are all pure A). The progeny of such a cross the author calls "sesquireciprocal hybrids."

---

[8] DEVRIES, H., Ueber doppeltreziproke Bastarde von *Oenothera biennis* L. und *O. muricata* L. Biol. Centralbl. **31**:97–104. 1911.

[9] ———, On twin hybrids. BOT. GAZETTE **44**:401–407. 1907.

From these results it is obvious that the eggs and sperms carry different morphological potentialities. The cross A×B results in an AB heterozygote which produces A eggs and B sperms. The reciprocal cross produces only B eggs and A sperms. DeVries offers the explanation that both A and B eggs and A and B sperms are produced, but that the B eggs and A sperms fail, an assumption which is in accord with the observation that about half the ovules and half the pollen grains are abortive.

DeVries has gone further and discovered just what potentialities are carried by each sex. In both pure-bred *O. biennis* and in its crosses with *O. muricata*, the pollen-borne type is epistatic to the seed-borne type, so that the latter is never seen; but in a series of crosses of *O. biennis* with "*biennis* Chicago," *cruciata*, *Hookeri*, *strigosa*, and *Lamarckiana*, the seed-borne type of *O. biennis* is epistatic to the pollen-borne type of the other species, thus allowing it to become visible. The F_1 offspring between *biennis* ♂ and all these other species resemble *O. biennis*, which therefore represents the pollen-borne type. The F_1 between *biennis* ♀ and all of the species mentioned gives a new form unlike *biennis* and unlike any of the pollen parents, but essentially identical in all the crosses. This new form is the seed-borne type of *O. biennis*.

The author calls it the "*conica*-type," because of its characteristic thick conical buds. It has been described already as "*velutina*" in the same author's papers on "twin hybrids." While *O. muricata* was incapable of such complete analysis as was given to *biennis*, owing to the fact that many of its hybrids are weak or sterile, several crosses in which *muricata* was used as the seed parent show that in this species also there is a morphological type determined by the egg cell different from that carried by the pollen cell. The seed-borne type of *O. muricata* is called by DEVRIES the "*frigida*-type." It comes to light in crosses of *O. muricata* as seed-parent with "*biennis* Chicago," *Hookeri*, and *strigosa* pollen parents. It has tall, strong, nearly glabrous stems, but little branched, with flowers resembling *O. biennis*.

These results are of unusual theoretical importance, and the study of double reciprocal hybrids will no doubt lead to the discovery of other instances in which different potentialities are borne by eggs and sperms.

HONING[10] has made a statistical study of the "twin hybrids" of *O. Lamarckiana* and *O. rubrinervis* in the attempt to identify the *velutina* with *rubrinervis* and *laeta* with *Lamarckiana*. He finds in nearly all the morphological characteristics which differentiate the twin hybrids a fairly close parallel with the characters of the mentioned species, and concludes that while they are not identical, *laeta* has a strong predominance of *Lamarckiana* characters, and *velutina* a similarly strong predominance of *rubrinervis* characters. He is convinced by these facts that *O. Lamarckiana* and *O. rubrinervis* are both of hybrid nature, each possessing in the latent state the characters of the other. He offers no suggestion, however, as to how it happens that this hybrid nature fails to express itself when *O. Lamarckiana* and *O. rubrinervis* are self-fertilized.

ZEIJLSTRA[11] has discovered that the most common form of *O. nanella* is parasitized by a *Micrococcus* which forms zoogloea-like masses in the cavities of the cells. The diseased plants have a characteristic appearance which makes them easily detected even in their early stages. Normal (that is, undiseased) *O. nanella* has also been discovered, but much more rarely, and the latter has never fruited. It is suggested that the true normal *O. nanella* may have been frequently overlooked, owing to its resemblance to *O. Lamarckiana*. How it happens that all the offspring of the diseased *O. nanella* are of the parental type needs investigation. The author points out two alternative explanations: namely, that this diseased strain of *O. nanella* inherits a susceptibility to the attack of the *Micrococcus*, or that the germ cells are themselves infected by the parasite. In the latter case a microscopic study of the germ cells should perhaps detect the presence of the *Micrococcus*.—GEO. H. SHULL.

---

[10] HONING, J. A., Die Doppelnatur der *Oenothera Lamarckiana*. Zeit. f. Ind. Abstam. Vererb. **4**: 227–278. *figs. 10.* 1911.

[11] ZEIJLSTRA, H. H., *Oenothera nanella* DeVries, eine krankhafte Pflanzenart. Biol. Centralbl. **31**: 129–138. *figs. 5.* 1911.